



# Hand-Crank USB Charger

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## TOOLS:

- [#0 or #00 Philips Screwdriver \(1\)](#)
- [10 Ohm, 1/8 Watt resistor \(1\)](#)
- [Hot Glue gun & hot glue \(1\)](#)
- [Multimeter or Continuity Tester \(1\)](#)
- [Soldering iron \(1\)](#)
- [USB A/B cable \(1\)](#)
- [Wire stripper/crimper \(1\)](#)
- [Zener diode, 5.1V, 1N4733A \(1\)](#)

## PARTS:

- [hand crank flashlight \(1\)](#)

## SUMMARY

I wanted to be able to charge my cell phone, MP3 player, and other USB devices while not having plug-in power available. This hand-crank generator, originally designed by [Ben Heck](#), ended up working the best.

## Step 1 — Hand-Crank USB Charger



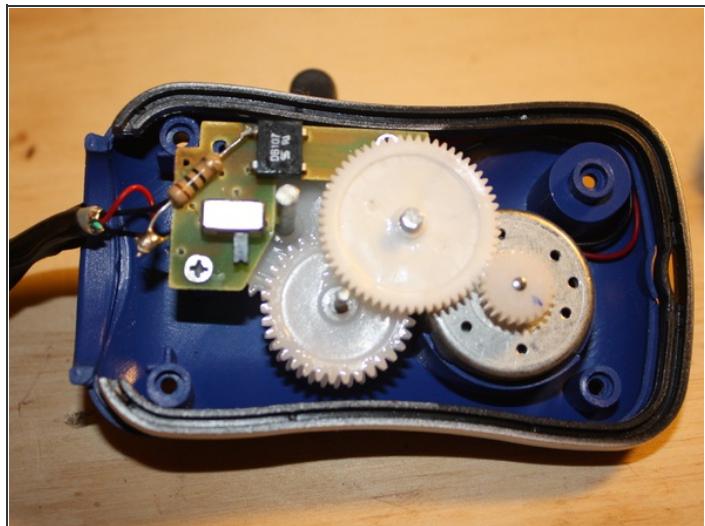
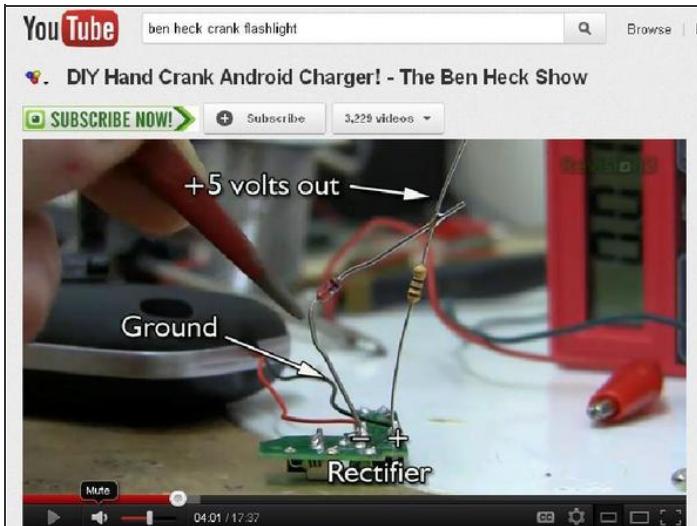
- I'm taking a trip to China soon, and last summer we spent a week without power due to downed trees all over the state. Let's just say it was a rough week. So I wanted to find a way to charge my USB stuff without using those battery packs. Originally I was thinking of making an Altoids can AA battery charger, until I stumbled upon Ben Heck's video on YouTube.

## Step 2



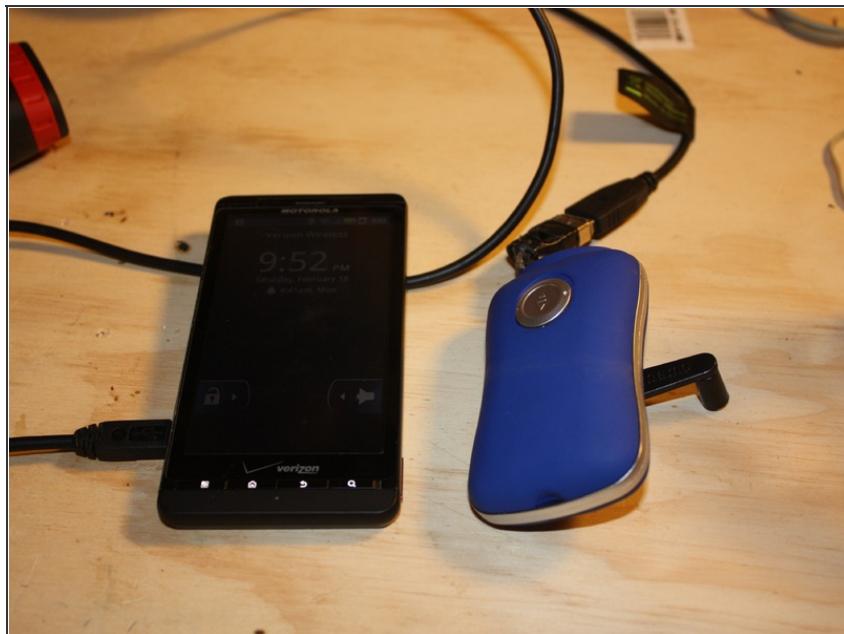
- First - RESEARCH. I needed to look up the pin specifications of a USB cord and find a USB extension cord. I needed the female end as well as the male end for testing.
- Second - I hit up Walmart and Harbor Freight for cheap hand-crank flashlights. I ended up getting 3 different lights. I got a Gordon crank light (\$8), a Gordon LED Dynamo flashlight (\$8 for a 2-pack), and an Energizer hand-crank flashlight (\$10).
- NOTES. Record your findings in your Maker's Notebook. (Shameless plug!)
- USB Pins - A quick Google search and you can find all this info, but basically on a regular USB-A cable you need the red and black wires.

### Step 3



- Next was a trip to YouTube and to RadioShack. Ben Heck from Element14.com has a video on this exact project.
- At RadioShack you will need to pick up a 10-ohm resistor as well as a 5V zener diode.
- I found that the small hand-crank LED light from Harbor Freight worked the best due to the fact that it was the only one with a rectifier. Solder your resistor and diode as seen in the picture (borrowed from [Ben's YouTube channel](#)).
- SIDE NOTE - You can actually remove all of the other components (3.6v battery, misc. resistors) from the PCB. You only need the rectifier.

## Step 4



- Finally, solder the red and black leads to the rectifier and the resistor as shown in the picture in the previous step. Plug in your phone/iPod/whatever and crank your heart out.
- Use your multimeter to make sure the diode is only putting out 5V (or thereabouts). If the voltage is higher, you could damage your device.

Check out The Ben Heck Show. A video where I learned about this project can be found [here](#).

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